

## Message Text

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PAGE 01 STATE 162298  
ORIGIN EB-08

INFO OCT-01 EUR-12 EA-10 ISO-00 DODE-00 NSAE-00  
TRSE-00 SOE-02 DOE-15 CIAE-00 COME-00 ICAE-00  
SSO-00 /048 R

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APPROVED BY EB/ITP/EWT:RPRACHT  
DOD:JKONFALA (SUBS)

-----047944 262238Z /70

O 262132Z JUN 78  
FM SECSTATE WASHDC  
TO AMEMBASSY PARIS IMMEDIATE  
INFO AMEMBASSY LONDON IMMEDIATE  
AMEMBASSY WARSAW  
AMEMBASSY TOKYO

C O N F I D E N T I A L STATE 162298

E.O. 11652: XGDS-1

TAGS: ESTC, US, UK, PO

SUBJECT: CRYSTAL PULLERS

REF: (A) PARIS 18112 (B) STATE 133833  
(C) PARIS 19741 (NOTAL)

1. VARIAN ASSOC. REPS DISCUSSED TECHNICAL RESULTS OF THEIR MEETING WITH UK OFFICIALS (MINISTRY OF TRADE OFFICIAL GRAHAM DOLBY AND CRYSTAL-PULLER EXPERT DR. BARDSLEY) WITH US EXPERTS (MINTHORNE OF COMMERCE, SWIGGARD OF NAVAL RESEARCH LABS (NRL) AND SEXTON, US NAVY, AND SEPARATELY WITH AUCOIN, ARMY ELECTRONICS ON JUNE 19) AND NON-TECHNICAL OBSERVERS FROM STATE, DEFENSE AND BRITISH EMBASSY ON JUNE 21.

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2. VARIAN REPS PRESENTED UK ARGUMENTS THAT VARIAN 2850 (US-COCOM DOC. (7861) AND UK MSR2 (UK-COCOM DOC (77) 409; (77)619; (77)685) WERE SIMILIAR IN PERFORMANCE. BRITISH ANALYSIS INDICATED THAT IF THE VARIAN PULLER WAS NOT CAPABLE OF GROWING STRATEGIC III-V COMPOUNDS, NEITHER COULD THE MSR2 SYSTEM. THIS WAS REBUTTED BY SWIGGARD WHO STATED THAT NRL IS PRESENTLY GROWING HIGH-

QUALITY GALLIUM ARSENIDE (GAAS) USING AN UN-MODIFIED MSR2. VARIAN REPS EXPRESSED SURPRISE (AND NO SMALL AMOUNT OF INTEREST) BUT APPEARED CONVINCED BY SWIGGARD'S TECHNICAL DESCRIPTION OF THE TECHNIQUES EMPLOYED.

3. FURTHER DISCUSSION FOCUSED ON DIFFERENCES BETWEEN THE MSR2 AND THE VARIAN 2850. SIGNIFICANT DIFFERENCES BEARING ON THE CAPABILITY TO GROW GAAS INCLUDE: (A) SMOOTH, LOW-SPEED PULLING. THE MSR2 CAN PULL SMOOTHLY AT RATES OF 2 CM./HOUR; THE 2850 BINDS AT THAT SPEED AND OPERATES SMOOTHLY ONLY AT RATES FROM 3-6 INCHES/HOUR, MUCH TOO FAST TO PULL GAAS; (B) HEATING SYSTEMS. THE MSR2 UTILIZES INDUCTION (RF) HEATING WHICH IS NECESSARY TO CONTROL TEMPERATURE GRADIENTS SO AS TO GROW SUCCESSFULLY; THE RESISTANCE HEATING SYSTEM UTILIZED IN 2850 IS NOT CAPABLE OF SUCH CONTROL; AND (C) SEALS. THE MSR2, A SMALL, FLEXIBLE PULLER, REQUIRES ONLY ONE-HALF INCH SEALS AND IS GENERALLY BUILT TO BE CAPABLE OF SUSTAINING THE 1.5 ATMOSPHERES OVERPRESSURE DESCRIBED IN THE BROCHURES. THIS IS MORE THAN ENOUGH TO GROW HIGH-QUALITY GAAS USING THE TECHNIQUES DEVELOPED IN THE US NAVAL RESEARCH LABORATORIES WHICH REQUIRE ONLY 0.9 THE 2850, ON THE OTHER HAND, IS DESIGNED SOLELY TO WORK IN A VACUUM, AND WOULD REQUIRE MAJOR ALTERATION OF SEALS AS MUCH AS 2 INCHES IN DIAMETER TO SUSTAIN ANY OVERPRESSURE. THIS IS MUCH CONFIDENTIAL

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MORE DIFFICULT TECHNICALLY THAT SOLVING PROBLEMS WITH ONE-HALF INCH SEALS. AS WELL, THE 2850 DESIGN THROUGHOUT MAKES NO ALLOWANCES FOR OVERPRESSURE OPERATIONS, FOR INSTANCE IN THE DESIGN OF VIEWPORTS.

4. NEXT STEPS: VARIAN REPS HAVE REPORTED THE RESULTS OF THE DISCUSSIONS WITH US EXPERTS TO DOLBY, WHO REPORTEDLY EXPRESSED SURPRISE THAT THE US WAS CAPABLE OF GROWING HIGH-QUALITY GAAS IN THE MSR2. DOLBY REPORTEDLY STATED THAT HAVING A US-PREPARED SIDE-BY-SIDE COMPARISON WOULD BE IMPORTANT IN THE UK'S FURTHER TECHNICAL EVALUATION OF THE CASES. VARIAN AND US EXPERTS ARE PRESENTLY PREPARING THIS WHICH WE HOPE TO BE ABLE TO HAVE NEXT WEEK. THE DOCUMENT WOULD BE PRESENTED TO THE UK EMBASSY HERE, THE UK COCOM DEL AND, IF EMBASSY LONDON BELIEVES IT USEFUL, TO APPROPRIATE UK OFFICIALS. IN EACH CASE, UK OFFICIALS WOULD BE URGED TO LIFT THEIR RESERVE ON THE US CASE. IF THIS IS UNAVAILING, A MEETING IS SCHEDULED FOR JULY 24 TO DISCUSS THE TECHNICAL ASPECTS BETWEEN UK EXPERTS (BARDSLEY) AND US EXPERTS (PROBABLY MINTHORNE, SWIGGARD, KLEIN AND AUCOIN) AT THE NAVAL RESEARCH LABS WHERE A MSR2 IS USED TO GROW

HIGH-QUALITY GAAS.

5. FOR USE DEL. UK REMARKS REPORTED REF (C) CALL,  
IN OUR OPINION, FOR A RESPONSE. US DEL SHOULD APPRISE

COMMITTEE OF THE ACTUAL OUTCOME OF THE MEETINGS,  
DRAWING ON PARAS (2) AND (3) ABOVE AND EMPHASIZING THAT  
MSR2 CAN BE USED TO GROW HIGH-QUALITY GAAS  
(IT IS DIFFICULT TO ARGUE THAT IT IS IMPOSSIBLE IN  
THE FACE OF EVIDENCE TO THE CONTRARY); AND (B) THAT  
BETWEEN THE CAPABILITIES OF THE MSR2 AND THE VARIAN  
2850 INVOLVE MUCH MORE THAN SIMPLY THE ABILITY TO  
SUSTAIN OVERPRESSURE.

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6. IF THE UK DEL IS UNWILLING TO REMOVE BRITISH CASES  
FROM AGENDA, US DEL SHOULD REQUEST PERMISSION TO  
INTRODUCE RELEVANT CORRESPONDENCE (UK-EMBASSY LETTER  
OF FEB. 2 (SQUIRE-FURNESS) AND ENCLOSURE AND DEPARTMENT'S  
RESPONSE OF APRIL 20 (FURNESS-BURNE LETTER) AND  
ENCLOSURES. ALTERNATIVELY, US DEL MAY TABLE  
ENCLOSURES TO APRIL 20 LETTER ALONE; WITHOUT, HOWEVER,  
FORMALLY OBJECTING TO UK CASES. US CASE SHOULD, OF  
COURSE, REMAIN ON THE AGENDA AND UK PRESS ALONG LINES  
REPORTED REF (C) PARA 2. VANCE

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## Message Attributes

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**Channel Indicators:** n/a  
**Current Classification:** UNCLASSIFIED  
**Concepts:** EXPORT LICENSES, CRYSTALS, STRATEGIC TRADE CONTROLS  
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**Copy:** SINGLE  
**Draft Date:** 26 jun 1978  
**Decaption Date:** 01 jan 1960  
**Decaption Note:**  
**Disposition Action:** RELEASED  
**Disposition Approved on Date:**  
**Disposition Case Number:** n/a  
**Disposition Comment:** 25 YEAR REVIEW  
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**TAGS:** ESTC, UK, US, COCOM  
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**Review Markings:**  
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